Exhibit 29

CHAPTER XII

TWO-SIDED MARKETS

A. Introduction

Nightclubs and online dating companies provide services to men and women who want to meet. Credit cards enable consumers who have them and merchants that accept them to transact with one another. Video game platforms, such as Sony PlayStation or Nintendo, provide software tools that enable publishers develop games and a device on which consumers can play those games. In each case, the business provides a platform that enables two distinct but related groups of customers to obtain value. These "two-sided platforms" or "two-sided markets" are the major form of business organization in many industries.[1]

1. David S. Evans & Richard Schmalensee, *Industrial Organization of Markets with Two-Sided Platforms*, 3 COMPETITION POL'Y INT'L 150, 152 (2007) [hereinafter Evans & Schmalensee, *Industrial Organization*] ("Many diverse industries are populated by businesses that operate 'two-sided platforms.' These businesses serve distinct groups of customers who need each other in some way, and the core business of the two-sided platform is to provide a common (real or virtual) meeting place and to facilitate interactions between members of the two distinct customer groups. Two-sided platforms are common in old-economy industries such as those based on advertising-supported media and new-economy industries such as those based on software platforms and web portals. They play an important role throughout the economy by minimizing transactions costs between entities that can benefit from getting together."). Many platforms have more than two groups of distinct users. *See* David S. Evans & Michael Noel, *The Analysis of Mergers That Involve Multisided Platform Businesses*, 4 J. COMPETITION L. & ECON. 663, 664 (2008) [hereinafter Evans & Noel] ("Many old industries are based on [multisided platforms or] MSPs, ranging from village matchmakers that date from ancient times to advertising supported newspapers introduced in the seventeenth century to payment cards introduced in the mid-twentieth century. However, an increasing number of significant modern businesses are MSPs as a result of technological changes that have drastically lowered the costs and increased the benefits

In antitrust cases involving two-sided platforms, market definition and market power analyses must take into account several economic issues that do not arise in other contexts. The two sides of a platform business are closely linked, with interdependent prices and outputs and intertwined strategies. To understand the relevant competitive relationships, one must consider both sides of the platform business.

For example, if an online dating service increased its prices to women, it would attract fewer women to its site. As a result, it would lose male members and, with fewer men, even more women would desert the service. Credit card issuers offer reward programs to persuade more people to use credit cards. As credit card use increases, card issuers can convince more merchants to pay for taking the card.

A platform can earn profits on either side. In practice, two-sided platforms often obtain most of their incremental profits on one side and may provide services to the other side at prices below incremental costs. For example, video game platforms earn most of their profits "on game developers through per-unit royalties on games and fixed fees for development kits and treat the gamers side as a loss leader."[2]

Most standard approaches to market definition, such as the SSNIP (small but significant and nontransitory increase in price) test, diversion ratios, conditional logit demand analyses,[3] and other economic models and formulae, do not apply to two-sided markets without modification, occasionally radical in nature.[4] Many of these "standard tools of antitrust

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of connecting diverse customer groups on a single platform. These include most Internet-based businesses such as eBay, Facebook, and Google. These businesses are creating new products and services such as social networking platforms and are disrupting existing industries such as advertising-supported media."). This chapter focuses on two-sided cases, but most concepts extend readily to multisided cases.

2. Jean-Charles Rochet & Jean Tirole, *Platform Competition in Two-Sided Markets*, 1 J. EUR. ECON. ASS'N 990, 990-91 (2003) [hereinafter Rochet & Tirole, *Platform Competition*].

3. *See, e.g.*, United States v. SunGard Data Sys., 172 F. Supp. 2d 172, 186-93 (D.D.C. 2001) (rejecting the government's market definition based on critical loss and SSNIP analyses); FTC v. Tenet Health Care, 186 F.3d 1045, 1050-51, 1053 (8th Cir. 1999) (relying on critical loss analysis).

4. David S. Evans, *Competition and Regulatory Policy for Multi-Sided Platforms with Applications to the Web Economy*, 2 CONCURRENCES 57 ¶ 28 (2008) (providing an overview of two-sided platforms); Evans & Noel, *supra* note 1, at 675 (explaining that "the one-sided Critical Loss formulas for conducting the SSNIP test are wrong when applied to two-sided markets"); Evans & Schmalensee, *Industrial Organization*, *supra*

and merger analysis . . . were developed based on the economics of single-sided businesses" and "do not necessarily apply in ways that are material to the analysis of competition that involves multisided businesses."[5] In most cases, that relationship does not hold without significant modification for two-sided platforms. For example, one common approach—using the price-cost margin on one side to assess critical loss—tends to understate the effects of a merger on prices compared with the two-sided market formula.[6] Another approach—estimating demand elasticities directly based on a standard one-sided model—tends to overstate the effects of a merger on prices.[7]

This chapter describes how two-sided platforms operate, explains the basic economics of profit-maximization for two-sided businesses, and notes some of the unique aspects of competitive strategies when one of the rivals is two-sided. It summarizes key market definition issues, shows the extent to which the use of standard techniques for two-sided platforms can result in bias, and addresses some basic conceptual issues for markets with two-sided platforms, such as how to measure output and which firms to include in the analysis. Finally, it discusses cases and agency decisions concerning two-sided markets.

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note 1, at 151 ("[P]rofit-maximizing prices may entail below-cost pricing to one set of customers over the long run and, as a matter of fact, many two-sided platforms charge one side prices that are below marginal cost and are in some cases negative. These and other aspects of two-sided platforms affect almost all aspects of antitrust analysis—from market definition, to the analysis of cartels, single-firm conduct, and efficiencies.").

5. Evans & Noel, *supra* note 1, at 664 ("Each side of the MSP's business influences and constrains its strategies on the other side. Antitrust analysis that focuses on one side of the business in isolation from the other side is incorrect as a matter of economics, and can lead to the wrong answer when indirect network effects are significant and are relevant for assessing the practice at issue.").

6. *Id*, at 682.

7. *Id.*at 670.

B. The Economics of Two-Sided Platforms

A two-sided platform provides goods or services to two distinct groups of customers who need each other in some way and who rely on the platform to intermediate transactions between them.[8] Two-sided platforms "minimiz[e] transactions costs between entities that can benefit from getting together[,]"[9] permitting value-creating exchanges to take place that would not occur otherwise.

> The fundamental role of a two-sided platform in the economy is to enable parties to realize gains from trade or other interactions by reducing the transactions costs of finding each other and interacting. Two-sided platforms do this by matchmaking, building audiences, and minimizing costs. Different platforms engage in these activities to different degrees. Software platforms are mainly about minimizing duplication costs, advertising-supported media in mainly about building audiences, and exchanges are mainly about matchmaking. But they all seem to engage in each to some degree. All platforms help reduce costs by providing a virtual or physical meeting place for customers.[10]

For example, newspapers, magazines, and other types of advertiser-supported media use content to attract readers and then sell access to those readers to advertisers. Advertisers need readers; media platforms reduce advertisers' cost of reaching target audiences, facilitating profitable transactions.[11] Online auction websites such as eBay provide

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8. *See* Evans & Schmalensee, *Industrial Organization*, *supra* note 1, at 151. *See generally* David S. Evans, *The Antitrust Economics of Multi-Sided Platform Markets*, 20 YALE J. ON REG. 325 (2003) [hereinafter Evans, *Antitrust Economics*]; David S. Evans, *Some Empirical Aspects of Multi-Sided Platform Industries*, 2 REV. NETWORK ECON. 191 (2003); Rochet & Tirole, *Platform Competition*, *supra* note 2; Jean-Charles Rochet & Jean Tirole, *Two-Sided Markets: A Progress Report*, 37 RAND J. ECON. 645 (2006) [hereinafter Rochet & Tirole, *Two-Sided Markets*].
9. Evans & Schmalensee, *Industrial Organization*, *supra* note 1, at 151; DAVID S. EVANS & RICHARD SCHMALENSEE, CATALYST CODE: THE STRATEGIES BEHIND THE WORLD'S MOST DYNAMIC COMPANIES 53 (Harvard Business School Press, 2007) [hereinafter CATALYST CODE]; *see* Rochet & Tirole, *Platform Competition*, *supra* note 2, at 995.
10. Evans & Schmalensee, *Industrial Organization*, *supra* note 1, at 158 (explaining that platforms "minimize transaction costs" through "matchmaking, audiencemaking, and . . . elimination of duplication").
11. *See generally* Simon P. Andersen & Stephen Coate, *Market Provision of Broadcasting: A Welfare Analysis*, 72 REV. ECON. STUD. 947 (2005).

platforms enabling sellers of goods or services find and consummate transactions with buyers. Importantly, each customer on one side tends to realize more value when there are more customers on the other side.[12] Shoppers value shopping malls that have more stores that are of potential interest to them while retail stores value shopping malls that have more potential customers.

Two-sided platforms usually perform three core functions to some degree.[13] They serve as matchmakers to facilitate exchange by making it easier for members of each group to find each other (e.g., eBay, MySpace.com, NASDAQ). They build audiences because this makes it more likely that members of a group will find a suitable match (e.g., Google, TiVo, Condé Nast, Fox News). Finally, they provide shared resources and reduce the cost of providing services to both groups of customers (e.g., Windows, Sony PlayStation, Xbox, SAP enterprise software, Linux, Palm OS).

Most two-sided platforms engage in all three core functions. For example, eBay makes it easier for a person who has a particular item and a person who wants a particular item to find each other. It does this in part by attracting a large number of buyers and sellers to its platform thereby making thicker markets for each item. Finally, it provides a common platform for matchmaking that reduces the costs of exchange for all participants.

A key feature of two-sided platforms is the presence of "indirect network effects."[14] Indirect networks effects exist when the value that a customer on one side realizes from the platform increases with the number of customers on the other side. A search platform is more valuable to advertisers if it is more likely that it will reach a larger

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12. Many two-sided platforms have positive indirect networks for both sides. In the case of advertising-supported media, advertisers value a platform more if it has more viewers but viewers may not value a platform more if it has more advertising; the platform solves this asymmetry in valuation by paying viewers to join the platform in the form of free content. Evans & Schmalensee, *Industrial Organization*, *supra* note 1, at 155-56.

13. CATALYST CODE, *supra* note 9, at 7

14. Evans, *supra* note 4, ¶ 8 & n.10 (citing Rochet & Tirole, *Two-Sided Markets*, *supra* note 8).

number of potential buyers. It is more valuable to users looking to buy something if there are more advertisers attracted to the platform because that makes it more likely that the user will see a relevant advertisement.[15] As a practical matter, it is often the strength of these indirect network effects that determines whether being "two-sided" matters enough to have a substantive effect on the results of economic analysis.[16]

Two-sided platforms' key feature is the symbiotic relationship between the two sides; the platforms must cater to two different customer groups simultaneously. To establish a two-sided platform, the founders must solve the "chicken-and-egg problem": customers on side A will not participate without customers on side B while customers on side B will not participate without customers on side A. The founders must be able to make credible commitments to one side that if they show up at the platform, the other side will be there as well. In some cases these commitments must be made virtually at the same time. For example, consumers will not carry a payment card unless they know they can use it at merchants' stores, and merchants and the processors who service them will not incur the cost of accepting a card unless they know that enough customers want to use it. In other cases these commitments occur sequentially. A shopping mall must first convince retailers that enough shoppers will come once the retailers locate there. Then the mall owner tries to attract shoppers to its completed mall.[17]

A related feature of two-sided platforms is the need to "balance" the demands of the two sides. In setting prices, a two-sided platform needs to consider that charging a higher price to side A will result in fewer A's using the platform which in turn will result in fewer B's getting value from the platform. It also needs to consider that there must be enough A's to be of interest to the B's and enough B's to be of interest to the A's

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15. *See* David S. Evans, *The Economics of the Online Advertising Industry,* 7 REV. NETWORK ECON. 359, 372-75 (2008).

16. In addition to traditional indirect network effects, externalities in use are also important: in the case of payment cards a product cannot exist unless there is a cardholder and an accepting merchant. *See* Evans, *supra* note 4, ¶ 8 & n.12 (citing Rochet & Tirole, *Platform Competition*, *supra* note 2).

17. *See* David S. Evans, *How Catalysts Ignite: The Economics of Platform-Based Start-Ups, in* PLATFORMS, MARKETS AND INNOVATION (A. Gawker ed. forthcoming 2009) (discussing solving the start-up problem for two-sided platforms); *see also* CATALYST CODE, *supra* note 9, at 89-91 (discussing two-sided platforms' pricing and commitment); Andrei Hagiu, *Pricing and Commitment by Two-Sided Platforms*, 37 (3) RAND J. ECON. 720 (2006) (same).

in most cases. Setting store rental prices too high at malls could result in shoppers not having access to the stores they most care to go to.

A two-sided platform's profit-maximizing calculus is thus more complex than that of a traditional business. The two-sided platform needs to consider the demands of both sides, the interrelationships between these demands, the costs directly attributable to each side, and the costs of running the platform. Many platforms consider both access fees to join the platform and usage fees to interact on the platform in establishing prices that attract the optimal volume of transactions on each side of the platform.

One side of a two-sided platform usually gets a better deal or receives service for free. For example, searchers do not pay search engines, advertisers do. Buyers do not pay a fee on many online transaction platforms, sellers do. Merchants, rather than cardholders, pay for most of the cost of payment card schemes. Retail stores, not shoppers, pay to get access to a shopping mall. End users pay for most software platforms, but software developers often get access to code for free. Women often get discounts from dating services, while men seldom do.

There are many practical reasons for price differences between the two sides of a platform. A two-sided platform has to attract enough members on each side to have sufficiently thick markets. Most business-to-business exchanges failed in the early 2000s because, even though many buyers had signed on, there were not enough sellers to make the exchange attractive.[18] A two-sided platform may therefore find that it has to keep prices very low to one side to attract enough participants to make the platform valuable to the other side. The side that is needed more or that is harder to get receives a price break; conversely the side that gets the most value out of access to members of the other side bears

18. *See* Bob Tedeschi, *Investing; How Killer B-to-B's Went Into A Tailspin*, N.Y. TIMES, May 7, 2000; Hazel Ward, *B2B Exchanges Fail to Deliver*, ComputerWeekly.com, Nov. 29, 2001, http://www.computerweekly.com/Articles/2001/11/29/183994/b2b-exchanges-fail-to-deliver.htm; Kate Hanaghan, *B2B Exchanges—What Happens Now?*, Silicon.com, Jan. 23, 2002, http://software.silicon.com/webservices/0,39024657,11030680,00.htm.

more of the cost. Economists have shown that the profit-maximizing prices for two-sided platforms can result in one side getting a price that is less than the incremental cost of providing a customer on that side and sometimes less than zero.[19]

Economic theory predicts that there will typically be a close relationship between prices and incremental costs for traditional single-sided businesses. Competition drives prices down to marginal cost[20] and prices and marginal costs tend to move in the same direction. Deviations between price and marginal cost are often taken as an indicator that firms have market power.[21] In two-sided businesses, however, there is not a close relationship between prices and marginal costs for the goods or services provided on a particular side. Because the conditions for profit maximization depend on demand elasticities and marginal costs for both sides and the cross-side network effects,[22] in theory, a profit-maximizing two-sided platform will respond to an increase in cost of side 1 with an increase in price on side 2 and no increase in price on side 1.

Some two-sided platforms set prices below marginal cost on one side to attract customers to whom they charge prices above marginal cost on the other side. Competition between platforms drives overall profits down. However, it is common to have a competitive equilibrium in which all of the firms have adopted the same skewed pricing structure that recovers most of the costs from one side while favoring the other side. The major payment card schemes in the United States, for

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19. *See, e.g.*, Rochet & Tirole, *Two-Sided Markets*, *supra* note 8, at 659 ("[I]t is quite common for a platform to charge below-cost (perhaps zero) prices to one side and high prices to the other."); Mark Armstrong, *Competition in Two-Sided Markets*, 37 RAND J. ECON. 668, 682 (2006) (noting that in some cases prices to one side of the two-sided platform are "below cost").

20. *See* Evans, *supra* note 4, ¶ 14 (citing Paul A. Samuelson & William D. Nordhaus, ECONOMICS (18th ed. McGraw-Hill/Irwin 2005)).

21. *See* U.S. DEP'T OF JUSTICE & FED. TRADE COMM'N, HORIZONTAL MERGER GUIDELINES, § 0.1 (1992) [hereinafter MERGER GUIDELINES], reprinted in 4 Trade Reg. Rep. (CCH) ¶ 13,104 ("Market power to a seller is the ability profitably to maintain prices above competitive levels for a significant period of time."); *see also* Dennis W. Carlton, *Market Definition: Use and Abuse*, 3 (1) COMPETITION POL'Y INT'L 2, 5 (2007) ("Roughly speaking, 'market power' means that the industry's behavior deviates from perfect competition. One standard definition of market power is the ability to set price profitably above the competitive level, which is usually taken to mean marginal cost.").

22. *See* Rochet & Tirole, *Platform Competition*, *supra* note 2, at 996-97.

example, all have pricing structures in which merchants pay for the much of the cost of the system while cardholders are subsidized through rewards and the float on their balances.[23]

A common condition for economic efficiency is that "the competitive price equals marginal cost of production."[24] Nonetheless, this condition does not necessarily hold in the case of two-sided platforms in part because there is joint production of services to the two sides.[25] For example, a shopping mall provides services jointly to retailers and shoppers. In some cases, the product cannot exist without both sides' participation: A credit card provides transaction services only if there is a person who uses the card for payment and a merchant who takes the card for payment.[26]

These considerations have implications for the analysis of market power. The analysis of either side of a two-sided platform in isolation yields a distorted picture of the business. The low-margin side will tend to appear highly competitive in the sense that prices are not significantly

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23. Evans, *supra* note 4, ¶ 15 & n.18 (citing David S. Evans & Richard Schmalensee, *The Economics of Interchange Fees and Their Regulation*: An *Overview*, in INTERCHANGE FEES IN CREDIT AND DEBIT CARD INDUSTRIES: WHAT ROLE FOR PUBLIC AUTHORITIES? (Santa Fe: Federal Reserve Bank of Kansas City, May 2005)).

24. *See* DENNIS W. CARLTON & JEFFREY M. PERLOFF, MODERN INDUSTRIAL ORGANIZATION 70 (4th ed. 2005).

25. This point was first observed for the case of payment cards in a seminal paper that is a precursor to the two-sided economics literature." Evans, *supra* note 4, ¶ 16 n.19 (citing William F. Baxter, *Bank Interchange of Transactional Paper: Legal and Economic Perspectives,* 26 J. L. & ECON. 541, 544 (1983)).

26. *See* Baxter, *supra* note 25, at 544 ("The mechanics of transactional services require that for every transaction in which a purchaser becomes a maker of a check, there must be one- and precisely one-transaction in which a merchant becomes a payee; similarly, each use of a credit card by a card holder must be matched by precisely one act of acceptance of the card (or, more accurately, the paper that the card generates) by a merchant."). *See generally* Nat'l Bancard Corp. v. Visa U.S.A. Inc., 779 F.2d 592, 594 (11th Cir. 1986) (discussing "the workings of the bank credit card industry").

higher than marginal cost. The high-margin side will tend to appear much less competitive because prices are much higher than marginal cost. Competition between platforms may result in squeezing the margins down on the high-margin side but will not fundamentally alter the skewed pricing structure which results from all firms' seeking to perform the same balancing act. To analyze market power and to understand competitive and anticompetitive strategies involving two-sided platforms one has to consider the interplay between the two sides.

C. Market Definition in Cases Involving Two-Sided Platforms

The purpose of market definition at its broadest level is to provide context for an antitrust inquiry by limiting the analysis to a manageable group of relevant companies and products. The relevant companies and products are the ones that could potentially limit the effects of the competitive practice at issue. The availability of demand-side substitutes limits the ability of a firm to raise prices and therefore harm consumers.[27] A firm's rivals may react to the practice at issue by countering its harmful effects or reinforcing them.[28] Market definition provides a screen that limits detailed antitrust scrutiny to those situations in which one cannot count on competition to counter the effect of a practice on price, output, innovation, or other measures of competitive performance.[29]

The business practice at issue must be considered in the context of both sides of the platform. A major competitive constraint on practices that affect one side of a two-sided platform comes from the impact of these practices on the platform's other side. A business practice that increases price and thus reduces the number of customers on one side of a two-sided platform will result in a decrease in demand on the other side for the reasons discussed above. Therefore, in assessing whether a business practice could lead to a price increase on one side of the platform, one would have to take into account both the reduction in demand on that side of the platform and the subsequent negative feedback effects on the other side.[30]

27. *See* MERGER GUIDELINES, *supra* note 21, § 1.
28. *Id,* § 2.
29. *Cf.* Carlton, *supra* note 21, at 22-23 (listing common mistakes in market definition).
30. Traditional market definition analysis focuses on the role of substitutes in constraining price—it does not focus, as it must in two-sided platform

The newspaper industry illustrates this point. Newspapers provide content that attracts readers and sell access to these readers to advertisers. Most newspapers earn the preponderance of their profits from advertisers.[31] Most major daily newspapers are sold at a price that roughly covers the incremental cost of printing and distributing those papers but does not contribute to the cost of providing the content.[32] When newspapers establish their profit-maximizing prices and production levels, they necessarily consider the interrelated impacts on the reader and advertiser sides.[33] If a newspaper were to increase the cover charge to its readers, the number of readers would decrease, resulting in the loss of advertising revenue.[34] Any analysis of business practices would hazard missing important effects if it did not consider the interrelated sides of the business.[35]

Courts and agencies have taken differing approaches to defining relevant markets in newspaper industry cases: some have considered the feedback effects between readers and advertisers, while others have focused on just one side of the platform. For example, in *United States*

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markets, on the role of complementary products (the two interlinked platform products).

31. Evans & Schmalensee, *Industrial Organization*, *supra* note 1, at 156.

32. *Id.*; *see* Roger D. Blair & Richard E. Romano, *Pricing Decisions of the Newspaper Monopolist*, 59 S. ECON. J. 721, 721 & n.2 (1993) (confirming that newspaper cover price is below marginal cost and the sales revenue does not cover the cost of ink and paper used in producing the newspaper) (citing studies showing that, in the 1980s, "a daily newspaper with a circulation of 250,000 typically generated circulation revenue equal to only 75-80 percent of the cost of ink and newsprint").

33. *See* Blair & Romano, *supra* note 32, at 722 ("Given the feedback effect of circulation on advertising demand, the publisher must be particularly concerned about the circulation price, which is not always under the publisher's control absent vertical integration. Given the feedback effect of circulation on advertising demand, the publisher must be particularly concerned about the circulation price, which is not always under the publisher's control absent vertical integration.").

34. *See id.*

35. See Chapter 5 for a discussion of the newspaper industry.

v. Times-Picayune Publishing,[36] the Supreme Court recognized that "every newspaper is a dual trader in separate though interdependent markets; it sells the paper's news and advertising content to its readers; in effect that readership is in turn sold to the buyers of advertising space."[37] Taking into account both sides of the platform business—its readers and its advertisers—the Court concluded that Time-Picayune Publishing did not occupy " a 'dominant' position in the newspaper advertising market in New Orleans."[38] By contrast, the U.K. competition authorities have acknowledged "the two-sided nature" of the publishing industry in some cases, while considering "only one side of the market" in other cases.[39]

1. Defining Relevant Products

Two-sided platforms serve two distinct sets of customers who receive different but related products or services. In some cases, the products or services the two sides receive are sufficiently similar that they can be combined into a simple metric that can be compared across firms and manipulated to calculate market shares and the Herfindahl-Hirschman Index (HHI). For example, online matchmaking businesses for men and women charge men and women similar prices and provide similar services to both. In a merger of two online matchmaking businesses, each firm's total revenues would be an accurate measure of their market positions.[40] However, market definition would also need to take into account the special competitive constraints on the conduct and pricing of two-sided platforms. If the combined firm were to raise prices to both sides, demand for its services would decline on each side. As a result, each side would value the matchmaking venue less because fewer potential matches would be available.[41]

36. 345 U.S. 594 (1953).
37. *Id.* at 610.
38. *Id.* at 610-11, 627-28 (overruling the district court's finding of dominance).
39. *See* John Wotton, *Are Media Markets Analyzed as Two-Sided Markets?*, 3 COMPETITION POL'Y INT'L 237, 240-44 (Spring 2007) (discussing cases).
40. *See* Evans, *Antitrust Economics*, *supra* note 8, at 360-361. The two-sided considerations for implementing the SSNIP test are still relevant in this case because a symmetric price increase will not only lower the direct demand for each side but also lower the indirect demand through the feedback effects. Evans & Noel, *supra* note 1, at 666.
41. Evans & Noel, *supra* note 1, at 667.

Most two-sided platforms, though, provide different products or services to the two sides. For example, software platforms such as Sony PlayStation provide game developers with software code to help them write games and supply users with game consoles and software enabling them to play games. Although game users and game developers are relying on the same code and hardware, they are paying different prices and are receiving different services. No single market share metric accurately summarizes the position of Sony or of competing video console makers. To understand market dynamics, one must consider both the competitors' shares of video console sales and their shares of game sales.

2. Considering Competitive Constraints on Both Sides

The competitive constraints on both sides of the platform should be taken into account. Since any business practice a two-sided platform engages in could result in an attempt to raise prices on either side, the ability to do so on either side affects the likelihood that the business practice will result in higher prices and profits. Consider alleged predatory pricing by a platform that is in competition with other platforms that all serve the same sides. As many contributors to the two-sided economics literature have observed, it is not meaningful to talk about predatory pricing on one side since it may in fact be profitable—and socially efficient—for all firms to charge less than marginal cost on that side.

Analyzing pricing on just one side could therefore lead to a false positive or to a false negative. A platform might reduce its price drastically on one side to drive a rival out of business but then choose to recoup its losses by raising price on the other side. One would need to examine whether prices have been lowered enough to make it unprofitable for competing platforms to operate at the margin (i.e., whether it would be profitable to carry out a joint incremental expansion of both sides of the platform). Under some legal tests one would also need to examine whether it is plausible that the preying platform could recoup its losses. A sound analysis would have to consider whether it is possible for the platform to recoup as a whole (i.e., across both sides) and should not focus on any particular side.

Consider the payment card industry. A card scheme could enter into a massive promotion campaign to persuade merchants to take its card exclusively. An analysis of the merchant side only might reveal that the card scheme has not recouped its losses. But the card scheme might also raise fees to cardholders. Taking both sides into account, it does recoup its predatory losses. [42]

3. Accounting for Diverse Business Models

Two-sided platforms coexist and compete with other business models to fulfill customer needs. Market definition must consider the diverse ways in which a two-sided platform may face rivalry, taking into account the market participants' reactions to price changes. These reactions are more difficult to predict when the firms are following different business models.

First, a two-sided platform may face single-sided competition on one or both sides. For example, a shopping mall developer faces competition from single stores for the attention of shoppers, as well as from real-estate investors that rent single-store locations. The degree to which these single-sided alternatives constrain the two-sided mall's conduct is an empirical question.

Second, a two-sided platform may compete with a three-sided platform. The three-sided rival produces another product which could, for example, have below-cost prices on both sides served by the two-sided platform. A two-sided platform is particularly vulnerable to competition by a three-sided platform that uses its third side to subsidize both of the other sides. This asymmetric competition is potentially lethal to a platform that does not provide the third side. A multi-sided platform can therefore use "envelopment" to challenge platforms that provide a subset of the services it provides.[43] It adds another group of customers to the platform and uses revenues from this group of customers to lower the price—possibly to zero—of the key profit-generating side of the other platform.

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42. *See* Julian Wright, *One-Sided Logic in Two-Sided Markets*, 3 (1) REV. NETWORK ECON. 44, 48 (2004) (explaining why a two-sided platform's below-cost pricing does not indicate predation).

43. *See* Evans, *supra* note 4, ¶ 25 & n.23 (citing Thomas R. Eisenmann, Geoffrey Parker & Marshall W. Van Alstyne, *Platform Envelopment* 1 (Working Paper 2007), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=996852).

For example, Google gives away office productivity software that competes with Microsoft's software to users and software developers.[44] By doing so, Google attracts customers and profits by selling access to those customers to advertisers.[45] Google can use its advertising revenue to compete with Microsoft in software. Competition from this advertising-supported software model has led Microsoft to enter into advertising to ensure that it also has a stream of advertising revenue available.[46]

Third, a two-sided platform may compete with a business that has vertically integrated into one of the sides and is therefore effectively single-sided.[47] Many two-sided platforms provide services to end users and to producers of complementary products that their end users value. Some businesses may decide to produce the complementary products themselves. Video game console makers used to produce their own

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44. *See* Evans, *supra* note 4, ¶ 26.
45. S*ee* Fred Vogelstein, *Gates vs. Google: Search and Destroy*, FORTUNE, Apr. 18, 2005 (Google "does not sell its search products [but] makes its money from the ads that accompany its search results"); *see also* Charles H. Ferguson, *What's Next for Google,* 108 (1) TECH REV. 38 (2005) (discussing competition between Google and Microsoft).
46. Microsoft's investment in advertising has included the launch of Microsoft adCenter, the company's online advertising platform, and the purchase of aQuantive, a family of digital marketing service and technology companies, for $6 billion. Press Release, Microsoft, Seventh Annual MSN Strategic Account Summit Celebrates Advertisers' Role in Microsoft Media Network Vision (May 3, 2006), http://www.microsoft.com/presspass/press/2006/may06/05-03SAS7PR.mspx; Press Release, Microsoft, Microsoft Acquires aQuantive (May 18, 2007), http://advertising.microsoft.com/uk/microsoft-aquantive-announcement.
47. The history of software platforms shows that firms can start out vertically integrated by providing both the software platform and its key complement such as "hardware, applications, and peripherals." *See* DAVID S. EVANS, ANDREI HAGIU & RICHARD SCHMALENSEE, INVISIBLE ENGINES: HOW SOFTWARE PLATFORMS DRIVE INNOVATION AND TRANSFORM INDUSTRIES 301 (2006) [hereinafter INVISIBLE ENGINES] (explaining that the PalmPilot began as an integrated bundle).

games and it was not possible to use third party games with the consoles.[48] Apple has chosen to make its iPod work only with its own media store iTunes while Sony has chosen to make its line of mp3 and media players work with multiple sources of media.

Finally, a two-sided platform may compete with a series of businesses that, when combined, provide similar services to the same two groups of customers. For example, American Express and Visa compete for cardholders and merchants. American Express is an integrated two-sided platform that performs all of the necessary steps for meeting cardholder and merchant demand. By contrast, Visa is a collection of separate entities that—when combined—perform services similar to those provided by American Express. Working from the merchant level to the cardholder level, there are acquirers that contract to take card receivables, merchant processors that handle the actual data processing and switching services, Visa that stands at the center of this platform as the switch for transactions, card processors that handle data processing for banks, and banks that issue cards to consumers.

Each of these market constellations results in different forms of competitive constraints and possible counterstrategies from rivals. The market boundaries that separate relevant from irrelevant constraints are particularly complex. That fact cautions against placing great weight on mechanical approaches to market definition that cannot account for competitive nuances and complexities.

A natural way to map out the contours of the market is to identify the groups of customers served by the subject of the inquiry and its likely rivals, and then identify the various businesses that serve these customers. The digital media business provides an example. Suppose one needs to define the relevant product market for a media player such as Adobe's Flash. As of 2007, Adobe has three groups of customers—end users who receive its player for free; enterprises that pay for its server; and content providers that use its tools to create content.[49] These three groups of customers are served to various degrees by (1) Apple's iPod/iTunes, a vertically integrated platform with its own media player; (2) Microsoft's Windows Media Player technologies included both in its client and server software; (3) RealPlayer, a stand-alone product for

48. *See* INVISIBLE ENGINES, *supra* note 47, at 301 ("[I]n video games both Sony and Microsoft acquired several high-profile game developers before releasing their consoles so that both end users and other game developers could reliably expect their consoles to have a number of high-quality games.").

49. *Id,* chapter 7.

clients and servers and the base for a media store that competes with iTunes; (4) software vendor Autodesk that provides tools to content providers to make their content available in various formats including Windows Media, QuickTime, or MPEG-2; and (5) various other businesses including Sorenson, Canopus, and others.[50] Not all these entities will necessarily be part of a properly defined relevant market. However, to define relevant markets in cases involving two-sided platforms, one must consider multiple types of potential competitors that may constrain the pricing and other strategies of the subject of the inquiry.

D. Two-Sided Critical Loss Analysis and SSNIP Tests[51]

The standard approaches to market definition do not apply to two-sided markets without significant modification. Even the two-sided versions of these approaches should be used with caution.

The price-cost margin, also known as the Lerner Index of market power, is often used in merger analysis.[52] The Lerner Index equals "the difference between price and marginal cost" expressed as a percentage of price.[53] When a firm has maximized its profits, the Lerner Index equals the inverse of the elasticity of demand.[54] The elasticity of demand "is

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50. *Id,* chapter 8.
51. See Chapter 1 for a discussion of critical loss analysis and SSNIP tests in one-sided markets.
52. *See* CARLTON & PERLOFF, *supra* note 24, at 93.
53. *Id.*
54. *See id.* at 92-93 ("[T]he price-cost margin depends only on the elasticity of demand the monopoly faces."). To maximize profits, a firm expands output to the point at which "the extra revenue from selling one more unit just equals the extra cost of producing that last unit of output. That is, profit is maximized where *marginal revenue equals marginal cost*." *Id.* at 91 (emphasis in original). When incremental revenue is greater than incremental cost, "total revenue increases as output expands," but when incremental revenue is less than incremental cost, "total revenue falls as output expands." *Id.* at 90. When profits are maximized, the firm's percentage profit margin is inversely proportional to the elasticity of demand for the firm's product. *See id.* at 92-93 ("The higher the

defined as the percentage change in quantity that results from a 1 percent change in price."[55] For example, a 50-percent profit margin corresponds to an elasticity of demand of two.[56]

> If the elasticity of demand is very high (a large negative number), then the [demand] curve is said to be very *elastic*. With a very elastic demand, a small price change induces a very large change in the quantity demanded. If the elasticity is low (a number between –1 and 0), the demand curve is *inelastic*, and a price change of 1 percent has relatively little effect on the quantity demanded.[57]

The Lerner Index—calculated in this way for a single product—must be considerably modified for use with two-sided platforms.[58] This section explains why the Lerner Index and other traditional merger analysis techniques must be modified and describes the two-sided version of these tests.

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elasticity of demand, the closer is the monopoly price to the competitive price. Therefore, the key element in an investigation of market power is the price elasticity of demand. Where the elasticity of demand is relatively inelastic, a monopoly markup may be substantial[.]"). The Lerner Index is based on various assumptions that may not hold true in practice and, as shown below, do not in fact hold true in the case of multisided platforms.

55. *Id.* at 92. When marginal and average variable costs are equal, the Lerner Index equals the contribution margin—gross margin (revenue minus variable cost) expressed as a percentage of revenue—which is often available from reported accounting data. *See* Evans & Noel, *supra* note 1, at 686.

56. If the profit margin is 50% or ½, its inverse is one divided by ½, which equals 2.

57. *See* CARLTON & PERLOFF, *supra* note 24*,* at 92 (emphases in original).

58. *See* Evans & Noel, *supra* note 1, at 676 ("The one-sided Lerner Index is incorrect for MSPs [multisided platforms] and relying on it significantly overestimates the true short-run own-price elasticity of demand and overstates Actual Loss."). There is no necessary theoretical relationship between marginal revenue and marginal cost on each side in isolation for the same reason there is no necessary relationship between price and marginal cost. *See* Evans & Noel, *supra* note 1, at 666. For many two-sided platforms, marginal revenue exceeds marginal cost on one side, but is less than marginal cost on the other side. It is possible to extend the single-sided Lerner Index to an analogous concept for two-sided platforms. *See* Evans & Noel, *supra* note 1, at 663 *passim* (exploring approaches).

1. The SSNIP Test[59]

The SSNIP test underlies market definition in merger analysis.[60] The antitrust agencies

> begin with each product (narrowly defined) produced or sold by each merging firm and ask what would happen if a hypothetical monopolist of that product imposed at least a "small but significant and nontransitory" increase in price [SSNIP], but the terms of sale of all other products remained constant. If, in response to the price increase, the reduction in sales of the product would be large enough that a hypothetical monopolist would not find it profitable to impose such an increase in price, then the [agencies] will add to the product group the product that is the next-best substitute for the merging firm's product.[61]

The agencies then ask

> [t]he price increase question . . . for a hypothetical monopolist controlling the expanded product group. In performing successive iterations of the price increase test, the hypothetical monopolist will be assumed to pursue maximum profits in deciding whether to raise the prices of any or all of the additional products under its control. This process will continue until a group of products is identified such that a hypothetical monopolist over that group of products would profitably impose at least a "small but significant and nontransitory" increase, including the price of a product of one of the merging firms. The [agencies] generally will consider the relevant product market to be the smallest group of products that satisfies this test.[62]

In most cases, the agencies "will use a price increase of five percent lasting for the foreseeable future," but may "use a price increase that is larger or smaller than five percent" depending on the industry involved.[63]

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59. This section compares two-sided and one-sided SSNIP tests. The one-sided SSNIP test's recognized deficiencies are also true in the two-sided context. See Chapter 1 for a full discussion of one-sided SSNIP test.
60. *See* MERGER GUIDELINES, *supra* note 21, § 1.11.
61. *Id.*
62. *Id.*
63. *Id.*

In one-sided context, the agencies apply the SSNIP test through calculations based on the Lerner Index or through direct statistical estimation of demand relationships.[64]

A two-sided platform "would like to find the prices for each side that maximize its profits."[65] As it adds customers on one side through, for example, an acquisition of a competing firm, it would ordinarily adjust prices to both sides. The standard one-sided SSNIP test would ignore the prices for the two-sided platform's other product, as well as the feedback effects between the two sides.[66] The application of a one-sided SSNIP test in cases involving two-sided platforms can result in a "relevant market" that includes just one side of a two-sided platform, even though that other side imposes significant constraints that would temper a price increase.[67] It would place key aspects of profit maximization and strategic interactions outside the "relevant market."[68] "[T]he market would be drawn too narrowly and estimates of market concentration too high, because the standard approach fails to consider the tempering effects on price coming from the other side."[69]

To illustrate this effect, consider a merger between two heterosexual dating clubs. The standard one-sided SSNIP test would focus on one side of the platform, ignoring the other side and resulting in an overly narrow market definition.[70] Using the standard one-sided SSNIP test, the change in profits of the hypothetical monopolist in response to an increase of the admission fee for men has two components: the monopolist gains from higher admission prices, but loses from the lower volume of sales of dating services to men. However, the feedback effects between the two sides amplify the monopolist's losses from the decrease in the demand for dating services from men.[71] As fewer men access the club, fewer women would be interested in joining the club.[72] The decrease in the number of women would in turn reduce the number of men, which would lead to a further decrease in the number of women, and so on.[73] A price increase deemed profitable under the one-sided

64. See Chapter 1 of this volume for a discussion.
65. Evans & Noel, *supra* note 1, at 665.
66. *See id.* at 667.
67. *Id.*
68. *See id.*
69. *Id.*
70. *See id.*
71. *See* Evans & Schmalensee, *Industrial Organization, supra* note 1, at 159.
72. *See id.*
73. *See id.*

SSNIP test may turn out to be unprofitable under the two-sided SSNIP test.[74]

A two-sided extension of the SSNIP test could address these issues at least in theory. The analyst would start with the two-sided platform at issue and add its closest substitutes.[75] The analyst would then ask whether the combined platforms could increase the weighted average price by a given percentage and thereby reduce the weighted average output of the platforms.[76] At each step, the hypothetical monopolist would be expected to "reoptimize prices across sides and across platforms," considering the feedback effects.[77] Additional platforms can be added. This approach becomes more difficult to implement when a two-sided platform faces diverse competitors with different business models.[78]

There are "many reasons to be weary of mechanical market definition exercises such as the SSNIP test," which "do not go away"—and in some cases are exacerbated—when two-sided platforms are involved.[79] For example, should one include both sides of the [two-sided platform] business . . . in the market definition of just one side? The answer can be difficult and depends on the situation at hand."[80] In discussing the SSNIP test, the *Merger Guidelines* refer to "adding or removing 'substitute products.'"[81]

> The difficulty is that the sides of a given [two-sided platform] represent highly complementary products, and pricing decisions on both sides

74. *See* Evans & Noel, *supra* note 1, at 669-70 ("Because the analyst's estimate does not account for feedback effects, the full impact of the price increase on demand is underestimated. As a result, antitrust markets necessarily will be defined too narrowly, and merger analysis will overstate the increase in market power of merging parties and overstate the predicted unilateral price effects of the transaction.").
75. Evans & Noel, *supra* note 1, at 669-78.
76. Evans & Noel, *supra* note 1, at 669-78.
77. *See* Evans & Noel, *supra* note 1, at 674.
78. Evans & Noel, *supra* note 1, at 669-78.
79. *See* Evans & Noel, *supra* note 1, at 674.
80. *Id.*
81. *Id.*

> critically affect the [platform's] profitability. Yet the SSNIP test is silent on handling complementary products. We believe if the two sides are very highly complementary and closely linked—for example, if the MSPs facilitates transactions between the groups that occur in fixed proportions—and MSPs in an industry all tend to serve the same two sides, then it can be reasonable to include both sides in the market definition and the "transaction" as the product. However, in other industries MSPs may all cater to the same side *A* customers but cater to very different kinds of side *B* customers. If the antitrust concern centered around the side *A* business, then including both sides of all MSPs that share the *A* side in the market definition would open a Pandora's box of unrelated "*B*" types that make no sense under a single coherent market definition. Then the market may need to be defined on the basis of side *A* only, but with the critical understanding that the *B* sides are an important constraint on behavior and that the formulas presented here must be used to account for its influence.[82]

Another issue with the SSNIP test is that "we would expect a hypothetical monopolist of several platforms to reoptimize prices across sides and across platforms just as we would expect a hypothetical monopolist to reoptimize across products in a one-sided world."[83] The *Merger Guidelines*

> suggest that the price increase deemed significant for market definition purposes will generally be uniform across all products within the definition (for example, 5 percent), and "the terms of sale of all other products [outside the proposed antitrust market] are held constant" (that is, 0 percent price increase). In the case of [two-sided platforms], one could instead imagine price increases that differ across sides or platforms, or consider a kind of 5 percent quantity-weighted "average" price increase across sides, allowing the hypothetical platform monopolist to reoptimize relative prices.[84]

2. Critical Loss Analysis Based on the Lerner Index

Critical loss analysis is a user-friendly technique for implementing the SSNIP test.[85]

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82. *Id.*
83. *Id.*
84. *Id.*
85. *See* Evans & Noel, *supra* note 1, at 668; *see also* Barry Harris & Cento G. Veljanovski, *Critical Loss Analysis: Its Growing Use in Competition Law*, 5 E.C.L.R. 213 *passim* (2003) (discussing the use of critical loss analysis in antitrust law); James Langenfeld & Wenqing Li, *Critical Loss*

> It compares "Critical Loss" (*CL*)—the percentage loss in quantity of a hypothetical monopolist's products that would be exactly enough to make an *X percent* price increase in the price of all its products unprofitable—to "Actual Loss" (*AL*)—the predicted percentage loss in quantity that the monopolist would suffer if it did increase prices on all its products by *X* percent. . . . A relevant market is found when Actual Loss equals Critical Loss for a hypothetical monopolist of the given set of products in the proposed antitrust market. If Actual Loss exceeds Critical Loss, the relevant market is expanded to include more substitutes. Otherwise, it is contracted.[86]

Critical loss is based on the incremental profit margin, while actual loss is based on the responsiveness of demand to changes in price of the product itself as well as that of substitutes.[87] This method "has won significant appeal both because of its simplicity and because of its easy measurement of inputs" based on available data.[88]

A common back-of-the-envelope calculation for merger inquiries uses the Lerner Index to estimate the elasticity of demand for actual loss.[89] However, the traditional Lerner Index for one side of a two-sided platform does not consider the role of the other side of the platform in

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Analysis in Evaluating Mergers, 46 (2) ANTITRUST BULL. 300 (Summer 2001) ("The antitrust agencies and economists have increasingly focused on concepts of "critical elasticity of demand" or "critical loss analysis" to define antitrust markets and evaluate the competitive effects of proposed mergers."). *See generally* Barry Harris & Joseph J. Simons, *Focusing Market Definition: How Much Substitution is Necessary?,* 12 RES. L. & ECON. 207 (1989) (discussing the use of the critical loss concept "in practice"); Michael L. Katz & Carl Shapiro, *Critical Loss: Let's Tell the Whole Story*, 17 ANTITRUST 49 (Spring 2003) (discussing market definition using critical loss analysis); Daniel P. O'Brien & Abraham L. Wickelgren, *A Critical Analysis of Critical Loss Analysis*, 71 ANTITRUST L. J. 161 (2003) (explaining economics of critical loss).

86. Evans & Noel, *supra* note 1, at 668.
87. *See id.*
88. *Id.* at 669.
89. See Chapter 1 of this book.

constraining price.[90] Suppose the analyst observes a profit margin of 25 percent. For a one-sided business, this profit margin would imply that the elasticity of demand facing the firm was four.[91] One could infer from this relatively high elasticity of demand that significant substitutes constrain the ability of the firm to increase prices.

For a two-sided business, a 25-percent profit margin would be consistent with less elastic demand, because the two-sided business would also have to consider the effect of raising prices on revenue from the other side and the resulting feedback effects. Thus a demand elasticity of less than four plus positive feedback effects would result in the 25-percent profit margin. The use of the Lerner Index will tend to overstate the elasticity of demand and understate the extent to which a firm—or the putative hypothetical monopolist—could raise prices.[92] All else equal, this mistake results in underestimating the market power on one side of the two-sided platform and defining markets too broadly on that side.[93]

It is possible to extend the simple version of actual loss analysis to two-sided platforms. The analyst would start with the two-sided platform at issue and consider substitutes.[94] The analyst would have to estimate the feedbacks between the two sides in addition to the profit margins.[95] Table 1 provides examples of the impact of feedback effects on actual loss estimation in cases involving many competing two-sided platforms.[96] It shows that the decision to expand or shrink the market

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90. Evans & Noel, *supra* note 1, at 666; *see id*. at 676 ("The one-sided Lerner Index is incorrect for [two-sided platforms] and relying on it significantly overestimates the true short-run own price-elasticity of demand and overstates Actual Loss.").

91. If the elasticity of demand is the inverse of the profit margin, and the profit margin is 25%, then the elasticity of demand is the inverse of 25%, 1/.25, or 4.

92. Evans & Noel, *supra* note 1, at 676.

93. Evans & Noel, *supra* note 1, at 670, 689. One should not, however, lose sight of the most fundamental mistake: leaving out the second side of a two-sided market altogether.

94. Evans & Noel, *supra* note 1, at 669-78.

95. Evans & Noel, *supra* note 1, at 669-78. In performing a preliminary calculation based on readily observed data, the analyst might have little basis to estimate the magnitude of the feedback effects.

96. To simplify the computation of the Critical Loss of output on side A, we assume that the two sides of the hypothetical monopoly platform are tied in fixed proportions. An example of such a platform is a transaction market like credit card services where a transaction takes place between a

definition depends on the assumed feedback effects between side A and side B (i.e., side A's effect on side B and side B's effect on side A). A decrease in the number of customers on side A as a result of the price increase on side A causes a decrease in the number of customers on side B, which in turn reduces the demand on side A.[97]

Table 1.

Impact of Feedback Effects on Actual Loss Estimation in Two-Sided Platforms, Assuming a Price Increase of 10% on Side A

Profit Margin on side A	*Elasticity of demand on side A*	*Feedback from side A to side B*	*Feedback from side B to side A*	*Actual Loss in Output on side A*	*Critical Loss In Output on side A*	*Expand / Shrink*
25%	4	2	1	-40%	17%	Expand
25%	4	2	1.1	-33%	17%	Expand
25%	4	2	1.25	-27%	17%	Expand
25%	4	2	1.3	-25%	17%	Expand
25%	4	3	1.11	-17%	17%	Market Defined
25%	4	3	1.25	-15%	17%	Shrink
25%	4	3	1.3	-14%	17%	Shrink
25%	4	3	1.3	-14%	17%	Shrink

3. SSNIP Tests Based on Demand Estimation

With enough data, time, and resources, one can implement a more rigorous version of the SSNIP test by estimating the relevant demand elasticities.[98] A typical one-sided analysis would consider potential substitutes for the products on that side, but would not account for the

customer on side A (card holder) and a customer on side B (merchant). With the assumed level of profit margins of 25% on both sides, the critical loss in output on side A is 17%.

97. *See* Evans & Schmalensee, *Industrial Organization*, *supra* note 1, at 159.

98. See Chapter 1 of this volume.

feedback effects between the two sides.[99] The traditional econometric models' estimates of the elasticity of demand for the product in question would be too small, because the models would not account for the feedback effects from the other side of the platforms.[100] These estimates will tend to yield an overly narrow one-sided relevant market.[101]

It is possible, however, to conduct a statistical analysis of demand that recognizes the two-sided nature of the market. Several empirical studies have done so.[102] For example, Rysman studies the feedback loop in the market for yellow pages.[103] He estimates "two demand curves simultaneously": . . . a consumer demand for directory usage as a function of [the demand for] advertising" and "an inverse advertiser demand curve for advertising as a function of consumer usage and the quantity of advertising."[104] He finds that consumer use of a directory "increases in the directory's level of advertising."[105] At the same time, retailer demand for advertising in a directory increases "in the amount

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99. See Chapter 1 of this volume.
100. Evans & Noel, *supra* note 1, at 669-670.
101. *Id.*
102. *See, e.g.*, Elena Argentesi & Lapo Filistrucchi, *Estimating Market Power in a Two-Sided Market: The Case of Newspapers*, 22 J. APPL. ECON. 1247 (2007) (analyzing network effects between readers and advertisers in the Italian magazine industry with an estimation of market power); Pierre Dubois, Adriana Hernandez-Perez & Marc Ivaldi, *The Market of Academic Journals: Empirical Evidence from Data on French Libraries,* 5 J. EUR. ECON. ASS'N 300 (April-May 2007) (linking readers and authors in the academic publishing industry); Ulrich Kaiser & Julian Wright, *Price Structure in Two-Sided Markets: Evidence from the Magazine Industry*, 24 INT'L J. INDUS. ORG. 1 (2006) (linking readers and advertisers in the German magazine industry); Mark Rysman, *Competition Between Networks: A Study of the Market for Yellow Pages*, 71 REV. ECON. STUD. 483 (2004) [hereinafter Rysman, *Competition*] (establishing a link between readers and advertisers in the yellow pages market); Mark Rysman, *An Empirical Analysis of Payment Card Usage* 55 J. INDUS. ECON. 1 (2007) (linking cardholders and merchants in the payment card industry); *see also* Elena Argentesi & Marc Ivaldi, *Market Definition in Printed Media Industry: Theory and Practice* (CEPR Discussion Paper No. 5096, 2005) [hereinafter Argentesi & Ivaldi] (summarizing antitrust cases involving market definition in (two-sided) media industries).
103. Rysman, *Competition*, *supra* note 102, at 483.
104. *Id.*
105. *Id.*

that consumers use the directory."[106] These results imply the existence of indirect network effects between the two sides.[107]

E. Cases and Agency Decisions

Several courts and antitrust agencies have explicitly recognized the two-sided nature of certain business platforms. As noted above, in *Times Picayune Publishing*, the Supreme Court took note of the linkages between the advertiser and reader sides and the constraints each side placed on the other.[108] In *National Bancard Corp. v. Visa U.S.A., Inc.*,[109] the district court and the Eleventh Circuit relied on an analysis put forward by Professor William Baxter to recognize the two-sided nature of Visa's business platform and conclude that Visa's interchange fee was a reasonable device for balancing the demand between cardholders and merchants.[110]

> There are two possible sources of revenue in the VISA system: the cardholders and the merchants. As a practical matter, the card-issuing and merchant-signing members have a mutually dependent relationship. If the revenue produced by the cardholders is insufficient to cover the card issuers' costs, the service will be cut back or eliminated. The result would be a decline in card use and a concomitant reduction in merchant-signing banks' revenues. In short, the cardholder cannot use his card unless the merchant accepts it and the merchant cannot accept the card unless the cardholder uses one. Hence, the [interchange fee] accompanies "the coordination of other productive or distributive efforts of the parties" that is "capable of increasing the integration's efficiency and no broader than required for that purpose."[111]

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106. *Id.*
107. *Id.*
108. 345 U.S. 594, 610-11 (1953).
109. 779 F.2d 592 (11th Cir. 1986).
110. *See id.* at 600-02.
111. *Id.* at 602 (quoting Robert H. Bork, *The Rule of Reason and the Per Se Concept*, 75 YALE L.J. 373, 474 (1966)).

The court of appeals upheld the district court's conclusion that the relevant market was "all payment devices," noting that the market was the same, whether viewed from the perspective of the plaintiff (processing agent), the defendant (credit card system operator), or consumers (cardholders).[112]

In *United States v. First Data Corp.*,[113] the U.S. Department of Justice (DOJ) sued to block a merger of First Data Corp. (First Data) and Concord EFS, Inc. (Concord).[114] First Data controlled NYCE Corporation, "the nation's third-largest PIN debit network."[115] Concord operated "STAR, the nation's largest PIN debit network" that handled "approximately half of all PIN debit transactions in the United States."[116]

Debit card systems serve consumers who use cards for payment and merchants that accept card payments.[117]

> To execute a PIN debit transaction, a customer swipes a debit card at a [point of sale (POS)] terminal and enters a PIN on a numeric keypad. After the PIN is entered, the POS terminal transmits the transaction and bank card information to a "merchant processor," which acts as a conduit between the merchant and the various PIN debit networks. The merchant processor sends the information to the appropriate PIN debit network, which switches the transaction to the issuing bank's "card processor." The card processor accesses the bank's account database to verify the PIN and ensure that the customer has sufficient funds to pay for the purchase. The card processor sends an electronic message to the PIN debit network accepting or rejecting the transaction. The PIN debit network switches this reply back to the merchant through the merchant processor to complete the transaction. The entire authorization process takes place electronically in just seconds. At the same time, the merchant acquirer "purchases" the transaction from the merchant, guaranteeing payment and facilitating settlement of the transaction.[118]

Many debit cards "can also execute 'signature' debit transactions in addition to PIN debit transactions. Signature debit transactions are

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112. *Id.* at 604 & n.20.
113. 2004 U.S. Dist. LEXIS 13590 (D.D.C. 2004).
114. United States v. First Data Corp., No. 1:03CV02169 (D.D.C. 2003) (verified complaint).
115. *Id.* ¶ 3.
116. *Id.*
117. *Id.* ¶ 16.
118. *Id.* ¶ 17.

authenticated like credit card transactions," except the customer signs for identification at the merchant POS instead of entering a PIN.[119]

The DOJ defined the relevant market as "the provision of PIN debit network services."[120] The DOJ explained that—compared to signature debit networks—PIN debit networks "offer a number of substantial advantages to consumers and merchants."[121]

> PIN debit networks are generally considerably less expensive to merchants than signature debit networks, due to significantly lower interchange rates. PIN debit networks also provide a more secure method of payment than signature debit because it is much easier to forge a person's signature than to obtain an individual's PIN; consequently, fraud rates for PIN debit are substantially lower than for signature debit. Because of the increased security of PIN debit, there is no need for the complicated and expensive charge-back procedures that allow consumers to challenge signature debit transactions, thereby saving merchants additional time and money. PIN debit transactions also settle instantaneously, guaranteeing the merchant ready access to its receipts, whereas signature debit transactions usually take a day or two to settle. Finally, PIN debit networks allow for faster execution than signature debit networks. With a PIN debit transaction, customers can enter their PIN as soon as the first product is scanned. By contrast, customers cannot sign for signature debit transactions until after the entire order is totaled, prolonging the checkout process.[122]

In addition, unlike signature debit networks, PIN debit networks allow customers "to receive cash back at the register when making a purchase."[123] Finally, customers using a PIN debit network benefit from "the additional security provided by PIN verification as opposed to signature."[124]

The DOJ recognized PIN debit networks as two-sided platforms:

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119. *Id.* ¶ 22.
120. *Id.* ¶ 25.
121. *Id.* ¶ 23.
122. *Id.*
123. *Id.* ¶ 24.
124. *Id.*

> The PIN debit network services market is characterized by significant network effects. Financial institutions are more likely to join networks that are accepted by many merchants. Conversely, merchants are more likely to accept networks that have many large financial institutions as members because the value of a particular PIN debit network depends in great measure on the breadth of its acceptance and use.[125]

The DOJ asserted that the hypothetical monopolist test was appropriate in a two-sided market. It explained: "There is no legal or economic support for the notion that the hypothetical monopolist test should be discarded simply because the PIN debit market is two-sided in nature . . . ."[126] It concluded that "the two-sided nature of the PIN debit market does not limit the ability of a network to profitably impose a moderate price increase on merchants."[127]

> While the [DOJ] applied a separate SSNIP test for both merchants and issuers, it expressly accounted for the two-sided nature of payment network markets in its analysis. When the [DOJ] analyzed the impact of a SSNIP on merchants, it considered the effect of such a price increase on both merchant and card issuer behavior, including whether the SSNIP would produce a change in issuer behavior that would render the merchant price increase unprofitable. Conversely, when the [DOJ] looked at the effect of a SSNIP on issuers, it examined whether such a price increase might change merchant buying patterns to a sufficient degree to make the SSNIP unprofitable. In theory, this approach could have produced different results for each side of the market. The [DOJ's] complaint focused on the presence of a PIN debit network services market for merchants because it concluded that merchants were most likely to incur harm from the merger. The [DOJ] did not state whether it believed that PIN debit network services was also a relevant product market for issuers, but did state in its pleadings that "most banks do not perceive PIN and signature debit networks as particularly close substitutes." [128]

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125. *Id.* ¶ 21.

126. United States v. First Data Corp., No. 1:03CV02169 (D.D.C. 2003) (plaintiff's pretrial brief).

127. *Id.* § V.C.

128. Renata B. Hesse & Joshua H. Soven, *Defining Relevant Product Markets in Electronic Payment Network Antitrust Cases,* 73 ANTITRUST L. J. 709, § IV.B.1 (2006); *see also* Eric Emch & T. Scott Thompson, *Market Definition and Market Power in Payment Card Networks,* 5 REV. NETWORK ECON. 45 (2006) (discussing market definition in payment card networks markets).

The government concluded that "[a] 5-10 percent increase in the fees the merchants pay for PIN debit would not change any of the above . . . . Consequently, the overwhelming majority of merchants would not reject or discourage customers from executing PIN debit transactions in response to a moderate increase in the price of the product."[129] The parties settled before trial by agreeing to divest the NYCE networks.[130]

In *GTE Media Services v. Ameritech Corp.*,[131] in assessing the competitive effects of the defendants' conduct in the Internet Yellow Pages segment, the district court recognized the two-sided nature of yellow pages businesses.[132]

> The commercial nature of the defendants' websites is revealed by the advertising revenues the defendants generate when users in . . . interact with their Internet Yellow Pages websites. Similar to publishers of the traditional, non-Internet Yellow Pages, the defendants directly earn revenue by selling advertising space to advertisers. Therefore, advertising revenue in the Internet Yellow Pages market substantially depends on the number of users accessing a particular website because Internet advertisers are willing to pay higher advertisement rates on websites with a higher volume of user traffic.[133]

The court concluded that the plaintiffs had adequately alleged antitrust violations, including "a conspiracy to monopolize the national Internet Yellow Pages market." [134]

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129. United States v. First Data Corp., No. 1:03CV02169 (D.D.C. 2003) (plaintiff's pretrial brief). The DOJ clarified that "consideration of the bank side of the market does not in any way suggest that the hypothetical monopolist test leads to the wrong result." *Id.* § V.C. This is perhaps best seen as an example of where the five-to-ten percent SSNIP test defines a narrow market that seems at odds with the economics of the business under consideration.
130. United States v. First Data Corp., 2004 U.S. Dist. LEXIS 13590, at *9-10 (D.D.C. 2004)
131. 21 F. Supp. 2d 27 (D.D.C. 1998).
132. *Id.* at 38-39.
133. *Id.*
134. *Id.* at 42-45.

> By channeling users away from competing services, such as GTE's SuperPages, the defendants not only restricted competitors from generating advertising revenue but also secured profitability for their website services. In this context, it is apparent that the purpose behind these concerted acts was to "drive . . . rival[s] from the market by exclusionary or predatory means."[135]

In defining markets in the newspaper industry, some competition authorities have focused on the characteristics of the publications' readers. In *Newspaper Publishing*,[136] the European Commission (EC) clarified that different categories of newspapers should not be considered substitutes from the point of view of buyers of advertising space because they "provide different 'channels' through which to reach different socio-economic groupings of readers."[137] The Italian antitrust authority took a similar position in *Class Editori/Sole 24 Ore*,[138] holding that advertising in "daily papers specialized in business and financial information" was a separate product market from advertising in "newspapers of general information."[139] The Italian antitrust authority concluded that "complementarities" outweighed "substitutabilities" because of "the different characteristics of readership between the two types of publications."[140]

In at least one case, in analyzing the two-sided market for printed media, the antitrust authority may have failed to "consider[] both sides of the market" when conducting econometric analysis.[141] In a case involving "two publishers or magazines and newspapers in France," the French competition authority

> sought to define the boundaries of the market for weekly magazines and general information and conducted an econometric analysis to ascertain whether this definition should include a larger number of titles than the definition used in previous decisions. The objective was

135 *Id.* at 45 (quoting Ass'n for Intercollegiate Athletics for Women v. NCAA, 735 F.2d 577, 585 (D.C. Cir. 1984)).

136. Case IV/M.423, Newspaper Publ'g (1994).

137. *Id.* ¶ 16 (noting the "very limited substitutability between the tabloid and quality segments").

138. Provv. n. 3336, Class Editori / Il Sole 24 Ore (1995).

139. Argentesi & Ivaldi, *supra* note 102, at 6.

140. *Id.*

141. *Id,* at 8-9.

> to estimate the cross-elasticities between different titles in order to decide which ones were to be included in market definition.[142]

Although the authority's decision did not report its estimation results, its "very low estimates of elasticities" could have resulted from "an inadequate econometric specification."[143] The French authority's econometric model, which did not take into account "the link between readers' demand and advertising demand," has been criticized as "potentially misspecified" and having potential to "lead to biased estimations of price coefficient and related elasticities."[144]

Google's acquisition of DoubleClick, cleared after in-depth investigations by the U.S. Federal Trade Commission, the EC, and other competition authorities,[145] involved interesting issues concerning two-sided markets and is an example of a case in which focus on market definition can obscure the dynamics of the business.[146] The merger involved online advertising for web publishers. Google is an integrated advertising platform that connects advertisers to publishers: it "provides online advertising services for web publishers and advertisers in addition to operating a search-engine that sells advertising space."[147] Web publishers sell space—and the viewers who see that space—to advertisers.[148] Publishers agree to program space to accept Google ads.[149] Advertisers bid on keywords that lead Google to insert ads on web pages that have those keywords.[150] Google, acting as an intermediary, splits the ad revenue with the publisher.[151]

"DoubleClick is principally a provider of server-based software tools and services for managing online advertising for web publishers and

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142. Argentesi & Ivaldi, *supra* note 102, at 8.
143. *Id.*
144. *Id.* at 8-9.
145. Evans & Noel, *supra* note 1, at 682.
146. *Id.*
147. Evans & Noel, *supra* note 1, at 682.
148. *Id,* at 683.
149. *Id.*
150. *Id.*
151. *Id.*

advertisers."[152] It (1) licenses software and provides services to publishers to manage advertising on their web pages, and (2) licenses software to advertisers to manage their advertising campaigns.[153] DoubleClick uses certain efficiencies from having publishers and advertisers use the same software as a selling point.[154] Publishers use DoubleClick's software to manage advertising they sell through direct sales forces and through advertising networks.[155] They generally do not use the software with Google's ad platform, which is a complete solution.[156] Large publishers will typically use DoubleClick or a competing software package for much of their ad space and will also use Google's ad platform.[157] Small publishers will often just use an integrated ad platform, such as Google's.[158]

Google's acquisition of DoubleClick involved a complicated multisided market.[159] As explained above, both Google and DoubleClick are two-sided platforms. Google operates an integrated platform; its advertising platform is the only thing that stands between the publisher and the advertiser. By contrast, DoubleClick provides an input into a decentralized platform. A publisher uses a software tool and one of several methods of intermediation, including its own sales force or advertising networks. An advertiser uses a software tool and one of several methods of intermediation, including buying agents and advertising networks.[160] DoubleClick supplies the software inputs to both sides.

Any economic effects of the Google/DoubleClick transaction result from the acquisition by an integrated platform of inputs into a

152. Evans & Noel, *supra* note 1, at 682.
153. *See* DoubleClick, *DART for Publishers*, http://www.doubleclick.com/products/dfp/index.aspx; DoubleClick, *DART for Advertisers*, http://www.doubleclick.com/products/dfa/index.aspx.
154. Evans & Noel, *supra* note 1, at 684.
155. *Id.*
156. *Id.*
157. For example, *Business Week* found that "[n]early all of the major Web publishers already use DoubleClick's services." *See* Robert Hof, *Google Launches DoubleClick Ad Exchange*, BUSINESS WEEK (Sept. 18, 2009).
158. For example, *USA Today* found that "[s]mall Web site operators have flocked to [Google's] AdSense as a way to attract advertising." *See* Jefferson Graham, *Google's AdSense a Bonanza for Some Web Sites*, USA TODAY, Mar. 10, 2005.
159. Evans & Noel, *supra* note 1, at 682.
160. *Id,* at 684.

decentralized platform.[161] Key issues are the extent to which the two platforms are substitutes taking both sides into account.[162] If the two types of platforms are in the same market, the inquiry should focus on the effect of the acquisition of an input into one platform type on prices and other competitive strategies.[163]

F. Conclusion

Market definition helps focus antitrust analysis on a relevant set of products and businesses. It limits the amount of data gathering and provides context for consideration of possible competitive effects. The fact that one or more subjects of the inquiry are two-sided platforms does not fundamentally alter market definition analysis. However, the interdependence between the two sides of a platform and the products and businesses relevant to both sides must be considered. The standard one-sided approaches to market definition will tend to exclude the other side of the platform, placing important two-sided considerations outside of the purview of the analysis and define markets too broadly or too narrowly depending on the technique used. While these approaches can be adapted for use in cases involving multisided businesses, market definition analysis in such cases is likely to be more difficult in practice and subject to greater error than in cases involving only single-sided businesses.

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161. Evans & Noel, *supra* note 1, at 685.
162. *Id.*
163. *See* Evans & Noel, *Industrial Organization*, *supra* note 1, at 682-89 (analyzing unilateral effects of the Google/DoubleClick transaction using two-sided versions of traditional econometric analyses).